Applied Research in the Economics of Silviculture

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Overview

Forests in B.C. receive silviculture treatment for many reasons. The most important relate to the Forest Practices Code which simply states that all areas harvested in B.C. must be returned to a specified forested condition in a specified period of time. There are also a wide variety of "incremental" treatments that can be applied to stands usually with the intent of increasing their expected value or the expected volume of fibre that will someday be harvested from them. Assessing these and other objectives requires above all else, GOOD INFORMATION, and the ability to measure the relative success of the objectives.

The intent of the applied research program in the Economics of Silviculture is to collect and compile information necessary to ensure wise investment in silviculture treatment activities in B.C. By wise investment, we mean allocating silviculture expenditures to treatments that are necessary for achieving forest management objectives.

This page presents abstracts and summaries of a variety of applied research projects that have been completed recently or are ongoing.

For copies of any of the reports, please contact Mark Messmer, (250) 356-9266 or email at Mark.Messmer@gems2.gov.bc.ca

A List of Recent Completed Reports Available from the Silviculture Practices Branch

Messmer, M. *Timber Supply and Silvicultural Investment in an Economic Context for Coastal British Columbia,* Natural Resources Canada, Canadian Forest Service, Pacific Forestry Centre, 1995, Report BC-X-355.

Abstract: Production possibilities are estimated for economically available industrial timber supplies for an area of Crown-owned forest along the British Columbia Coast. Biophysical timber inventory is appraised with delivered wood costs and prices, and a simulation model known as the Price Responsive Timber Supply Model is used to project both within-period and over-time supply curves. The results from eight simulation scenarios are presented, where each scenario varies by real future price increase, real interest rate, other price shocks, exogenous harvest schedules and three classes of silviculture expenditure. The report concludes with a discussion of how the methodology could be applied operationally to determine both extensive and intensive margins for industrial timber production.

Messmer, M. *Allocating Silviculture Expenditures to Meet Forest Management Objectives: A Possible Method and Example,* Forest Stand Management and Practices Section, Silviculture Practices Branch, B.C. Ministry of Forests, Working Paper, February, 1996.

Abstract: Silviculture treatment is essential for ensuring a continuing harvestable timber supply. An important challenge associated with silviculture treatment is determining the necessary level of treatment. Accomplishing this has always been an extremely difficult task. This study uses linear programming to demonstrate a method for determining levels and kinds of silviculture expenditure to meet targeted objectives. The two objectives under investigation involve maximizing net revenue and total volume from harvesting activity over a 150-year planning horizon from a land base defined by economic operability criteria and projected real price trends. The paper uses a simplified example to demonstrate that it is possible to design a model and database which rationalizes silviculture expenditures based on economic attributes.

Massie, M. and M. Messmer. *Potential Gains from Stand Level Silvicultural Expenditures for a Selection of Coastal and Interior Sites,* Forest Stand Management and Practices Section, Silviculture Practices Branch, B.C. Ministry of Forests, Working Paper, March, 1996.

Abstract: This report presents a selection of stand level scenarios for various incremental silviculture treatments. The net economic gain, which is defined as the difference between the net present values of the treated and untreated stands minus the stand treatment costs, is presented for different price projection, site index and initial stand density combinations. A ten year period is used to analysis each treatment. A common period is employed in order that the treatments may be ranked according to net gain. Information provided within the study serves as a basis for establishing guidelines to determine the types of stands to be considered for treatment.

Feltham, S.G. and M. Messmer. *Sawnwood Values and Species Effects on Quality: An Historical Perspective for B.C.,* Forest Stand Management and Practices Section, Silviculture Practices Branch, B.C. Ministry of Forests, Working Paper, March, 1996.

Abstract: This report provides a summary of various studies pertaining to historical price growth rates and projected future rates for sawnwood, calculations of historical price changes and a wood quality index for British Columbia and Canada. The review of the sawnwood price studies reveals that historical and projected price growth rates vary between studies. Despite the variation in the rates, the review finds that there is a general consensus among the studies that prices will increase at a decreasing rate. The calculations of historical price changes provide a range of real rate price increases, which can be used for sensitivity analysis of silviculture activities. Finally, the wood quality index demonstrates that between 1925 and 1990 the annual rate of decrease in wood quality attributable to the change in species composition averaged 0.14% and 0.125% for British Columbia and Canada, respectively.

McCandless, L. *Forestry Employment in British Columbia: A Time Series Analysis,* Forest Stand Management and Practices Section, Silviculture Practices Branch, B.C. Ministry of Forests, Working Paper, July, 1996.

Abstract: This study analyzes the Granger causal relationships between U.S. housing starts, B.C. Gross Domestic Product, billed timber and forestry employment for the period 1963-1993. The time series, consisting of annual observations, are examined on forestry employment as a whole and on logging and other wood industries employment separately. In order to investigate possible Granger causality between these variables, bivariate and multivariate vector autoregressive models are formulated based on the order of integration of each series. The results generated from the vector autoregressive models suggest that U.S. housing starts Granger cause B.C. forestry employment.

Current Projects

These are projects that have been initiated over the past year and will be completed sometime over the next year or two.

1. Queen Charlotte Islands District Strategic Silviculture Plan

Objectives:

- Determine on a five year plan (period) basis the total amount of incremental silviculture expenditure required to achieve specific timber supply objectives for the district
- Define timber supply objectives as explicitly as possible in terms of where on the TSA, how much, when, and what kinds of timber need to be available for harvest, to the extent that data are available to define these timber objectives
- Define the cost and yield components for a number of silviculture regimes being applied or proposed to be applied in the district, which require incremental silviculture expenditure. Yield components for these regimes should be defined as best as possible in terms of the kinds of timber produced, in terms of species and approximate grade classes
- Develop a district-managed system and model that can be utilized by district staff to conduct their own

silviculture budget scenarios to be consistent with their timber supply objectives

It is hoped that an initial draft of this plan will be available for review and comment by December, 1997.

2. Invermere Forest District Strategic Silviculture Plan

Objectives:

- Determine on a five year plan (period) basis the total amount of incremental silviculture expenditure required to achieve specific timber supply objectives for the district
- Define timber supply objectives as explicitly as possible in terms of where on the TSA, how much, when, and what kinds of timber need to be available for harvest, to the extent that data are available to define these timber objectives
- Define the cost and yield components for a number of silviculture regimes being applied or proposed to be applied in the district, which require incremental silviculture expenditure. Yield components for these regimes should be defined as best as possible in terms of the kinds of timber produced, in terms of species and approximate grade classes
- Develop a district-managed system and model that can be utilized by district staff to conduct their own silviculture budget scenarios to be consistent with their timber supply objectives

This project is one of many applied research projects being completed under the Ministry of Forests Enhanced Forest Management Pilot Project.

It is hoped that a final report for this plan will be available for review and comment by August, 1997.

3. Arrow District *Armillaria Ostoyae* Forest Level Root Rot Analysis

Armillaria Root Rot is believed to affect the growth and mortality of a significant area of forest land in B.C.'s Southern Interior. Stands can be treated in a variety of ways to mitigate the spread and impact of the disease, but these treatments are expensive, and may have adverse affects on soil degradation or long term timber supply. The purpose of this analysis is to determine an appropriate methodology for measure the impact of root rot on forest level objectives such as timber supply and the potential effects that various treatment expenditure levels may have on root rot incidence and forest outputs and objectives.

A final report from this analysis will be available for review and comment in August 1997.

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